

osteogenic powers of the periosteum pointed out by M. Flourens and M. Ollier. Instead, however, of dissecting the periosteum from the bone, and removing the latter (a proceeding which offers some difficulty), M. Sédillot leaves the whole cortical portion of the bone, as above stated, and removes the carious parts.

On the 31st of October last the author brought before the same Academy an account of the cases operated upon in this manner. Ten patients recovered, and three died. Amongst the former, M. Sédillot mentions the case of a young girl in whom he had scooped out the lower third of the femur and the condyles; she now walks very well. Another case is that of a young man suffering from caries of the lower part of the left tibia; the scooping here included the whole of the articular extremity, and the inside of the malleolus; the patient now works hard, and can walk fifteen or sixteen miles. The fatal cases may not be charged to the operation; one died of epidemic sloughing phagedena six weeks after the scooping, and the others several months after submitting to operative procedures. M. Marmy, of Lyons, and M. Ehrmann, a military surgeon in Algeria, have both sent to the author a successful case of this operation.

If we are not much mistaken, M. Sédillot's operation has much analogy to the gouging in caries so often successfully practised in the hospitals of this metropolis. But a real improvement in the operation of resection of joints is the careful preservation of as much periosteum from the extremity of the articular surfaces some distance up the shafts as has not been destroyed by the progress of disease. This should be borne in mind by those surgeons who frequently perform resection of joints; nor are the practical proofs of the utility of these precautions wanting. M. Verneuil, of Paris, for instance, has placed several cases of resection of the elbow before the Academy of Sciences, and shows that, by dissecting very carefully whatever periosteum is left, he had, by regeneration of bone, in one of his cases, only two inches shortening, after having removed altogether four inches of osseous texture from the humerus, radius, and ulna. In another case, M. Verneuil was able to leave a regular cylinder of periosteum at the lower extremity of the shaft of the humerus; and in this instance, also, the results were extremely satisfactory.—*Lancet*, Dec. 10, 1859.

31. *Extra-Capsular Fracture of Neck of Femur*.—Prof. ALEX. GORDON, of Queen's College, Belfast, relates (*Dub. Hosp. Gaz.*, Sept. 15, 1859) the following interesting case:—

“William Mitchell, aged 58, but apparently older, a pensioner, admitted into the Belfast General Hospital, February 12, 1859. He states that his habits are temperate, that for some time past he has been subject to a chronic cough and shortness of breathing. On the evening previous to his admission, when passing along a dark lane, he was tripped by a rope, fell against the curb-stone, and broke his thigh. On admission into hospital, the long splint was applied. On visiting him on the following day, there was no deformity, no shortening of the limb, nor complaint of pain in the thigh or hip.

“15th. As the difficulty of breathing had increased, obliging him at intervals to assume the sitting posture, he removed the perineal band to be enabled to sit up. To permit him, therefore, to do so with greater facility and comfort, the long splint was taken off, and the limb placed on the double-inclined plane. This did not cause him pain, at least he made no complaint, nor was the fracture apparently disturbed.

“16th. His expression is maniacal; he is talking incoherently. During the night he made several attempts to rise out of bed. The upper fragment of femur can be felt distinctly, about three inches below the trochanter major, causing the thigh at this part to be much bowed outwards. Measurement along the convexity does not show any shortening of the limb, but that of the concavity, or inner side of thigh, is shorter by two inches at least. Pulse 88, soft; skin moist; bowels open; tongue slightly furred; respiration 40. The limb was extended, and a pad and splint applied to the outer side of thigh, which was still kept on the double-inclined plane, and a broad piece of linen, with straps attached, was laid along the outer side of opposite thigh; some of the straps were carried behind, and others in front of the thigh, and being tied, prevented the outward displacement.

"20th. Is becoming insensible; the forehead is covered with an abundant perspiration; pulse 108.

"He died on the night of the 21st, the ninth day after the accident; and on the following day the femur was removed from the thigh; much blood was effused amongst the various tissues of the limb, even down to the knee. At first sight, the accident seemed to be a fracture of the upper third of the shaft of the femur, running obliquely upwards to the anterior part of the root of its neck; the capsular ligament attached to its end, preventing displacement upwards; but on removing this ligament, and the other soft parts adherent to the bone, it was found to be an extra-capsular fracture of the cervix femoris.

"When the periosteum was on the cervix, the line of fracture on the fore and upper part of the neck was so indistinct as to be incapable of detection, either by the sight or touch, and it was only by moving the fragments that the whole of its course could be traced. Now, however, when the parts have been boiled, we are able to perceive the full extent and true nature of the injury. The more carefully the case is studied, the more interesting it becomes, as affording us an example of extra-capsular fracture, which may have an influence in settling disputed points, by corroborating the views entertained by some, whilst at the same time it modifies, or is opposed to the statements or conjectures of others.

"The fracture may be said to consist of four main fragments, in each of which may be included several minor ones.

"The first consists of the head and neck. The second consists of the trochanter major; the posterior intertrochanteric line; part of the posterior surface of the lesser trochanter; and a triangular portion of the upper end or the shaft, which may be easily determined by a point on its external surface three and a quarter inches below the base of the trochanters; and from the point just indicated by drawing two other lines, one passing upwards and inwards, and ending where the base of the trochanter joins the neck, the other upwards and backwards to the lesser trochanter. We have thus a portion of the anterior external and posterior surfaces of the shaft attached to the trochanter major and posterior intertrochanteric line. The third portion consists of the lesser trochanter, and a small elongated triangular piece, running obliquely downwards and backwards to the linea aspera. The fourth portion consists of the remainder of the shaft.

"Let us now trace the line of fracture. On looking downwards at the centre of the upper border of the trochanter, where the neck of the femur joins it, impaction commences. The fracture from this point runs obliquely downwards and backwards, internal to the digital fossa; after that it corresponds exactly to the junction of the neck with the posterior intertrochanteric line, and on reaching the upper and back part of the root of the lesser trochanter, it bifurcates, the posterior division running along the middle branch of the linea aspera, whilst the other branch runs above the lesser trochanter, separating it from the neck, and having gone forwards so as to be on a vertical plane anterior to the lesser trochanter, it again divides into a descending and ascending branch. The former running in front of the lesser trochanter, and passing obliquely downwards and backwards joins the branch behind it, or that which is in the middle branch of the linea aspera. Thus we have the lesser trochanter, with a triangular piece of bone attached to it, completely isolated. At the place where the fracture passes above the lesser trochanter, separating it from the neck, there were several comminuted pieces of bone. The fracture after that takes a course upwards and outwards along the inner border of the anterior intertrochanteric line as high as the base of the trochanter. There the impaction ceases, the remainder of the fracture along the upper and anterior part of the root of the neck did not suffer the slightest displacement. Anteriorly, where the intertrochanteric line joins the trochanter, the fracture of the upper end of the shaft commences, whence it runs obliquely downwards and backwards, and joins that proceeding from the lesser trochanter, three and a quarter inches below the base of the greater trochanter. Besides these complete separations, we find partial fractures or fissures, which have, as I shall presently attempt to show, an important bearing on the mode by which fracture of the trochanter is produced. In the upper and external surface of the trochanter major there is a

letter H-like fissure, the upper limbs of which ascend over the upper border of the trochanter, and join the main fracture opposite to the commencement of the impaction, whilst the lower limbs pass half way down the trochanter. The extent of space within these vertical limbs is nearly one-third of the transverse breadth of the trochanter. There is also another fissure in the upper part of the posterior intertrochanteric ridge, which ends in the posterior and superior angle of the greater trochanter.

"Previously to the patient becoming delirious, I was fully satisfied with the statement made by our intelligent house pupil, Mr. Moore, that there was merely a fracture in the upper third of the femur; there was not the slightest appreciable deformity, nor did the patient make any complaint; and even when, in his delirium, he had disarranged the relation of the fractured surfaces, and even when I found the point of the lower end of the upper fragment displaced outwards three and a quarter inches below the base of the trochanter, the thought of the fracture being extra-capsular never occurred to me.

"As the conclusions at which I have arrived from the study of this specimen of extra-capsular fracture are in several respects not in accordance with those of others, I shall first consider the question of shortening of the limb. Dr. Smith says: 'From the opinion, therefore, of Rodet, that there may be no shortening of the limb in certain cases of fracture external to the capsule, I must altogether dissent . . . for in all such injuries there is impaction, and, if so, there must inevitably be shortening of the limb, even though there be no loss of obliquity in the neck of the femur, no separation or displacement of the fractured trochanter, no laceration of the fibrous structure.' (Smith on *Dislocations and Fractures*, pp. 18, 19.) Now, the question at issue is this: Is Dr. Smith right in maintaining that there is, in every instance of fracture of the neck of the femur, external to the capsule, a primary and immediate shortening. and Rodet wrong in supposing that when the trochanter and the fibrous tissue surrounding it is uninjured there is no shortening? I am fully sensible of the difficulty of giving a positive value to the precise signification of the term shortening. If by the words 'primary and immediate shortening,' Dr. Smith means a shortening that can only be detected by the most accurate measurement—a measurement that will detect shortening to the extent of a line, or a line and a half at the utmost—then I should say that this specimen will corroborate his statements. If, on the other hand, he means to imply a primary and immediate shortening, unequivocally capable of being detected in the living subject, and leaving no doubt on the mind of the surgeon that there is shortening—then I say that this specimen will not warrant such a positive statement. On the fore and upper part of the neck there is not the slightest displacement, and even behind and below at the base of the lesser trochanter, where the impaction is best marked, it is not more than a line and a half at the utmost. Now, is it possible that such a slight degree of impaction could cause a primary and immediate shortening capable of detection in the living? I think not. I am, therefore, bound to adopt the following inference, that this is an undoubted example of extra-capsular fracture, in which there was scarcely any eversion of the limb, and no shortening capable of being detected by the most accurate measurement. But, in addition to this, it presents us with an example of an extra-capsular impacted fracture, in which shortening might be referred to two different conditions of the same fracture. The first is that to which I have already referred, viz.: the impaction of the neck of the femur. The second is the oblique fracture through the shaft, which was produced in the following manner: When the lower part of the neck was driven into the shaft by the shock, it became wedged between the posterior part of the base of the lesser trochanter and the inner surface of the shaft, and instead of detaching the posterior part of the base of the lesser trochanter and inferior part of posterior intertrochanteric line, it caused a very oblique and complete fracture of the shaft itself. Although anteriorly and internally the upper part of the shaft is detached from the base of the neck, almost as high as the anterior and internal part of the base of the greater trochanter, and after that running outwards and downwards for three and a half inches, until it meets with that proceeding downwards from the lesser trochanter, still there was no

displacement in the vertical direction, as the attachments of the capsular ligament in front, and the insertion of the gluteus maximus behind prevented it.

"Another interesting question in connection with this fracture is the *modus operandi* of the force causing it. With the first part of Dr. Smith's explanation, I entirely agree, but the latter I cannot adopt. He says (*Ibid.*, p. 17): 'What occurs appears, in fact, to be this—the neck of the femur is, in the first instance, broken by the fall upon the hip, and then driven into the cancellated tissue, between the trochanters, by the weight of the body, and the prolonged action of the shock; but as soon as the neck of the bone is broken, the femur is rotated outwards, and even before the action of the first impulse has ceased. Thus the posterior intertrochanteric ridge being thrown forwards, is forcibly driven against the back of the neck of the femur; two forces, therefore, combine to produce the fracture through the intertrochanteric space, one of which consists in the impaction of the cervix into the shaft, whilst the other is found in the collision which takes place between the broken neck of the bone and the posterior intertrochanteric ridge.' In this, and several other specimens in Queen's College Museum, I do not find that the posterior intertrochanteric ridge lies in contact with the posterior surface of the neck, and, therefore, cannot admit that it is driven forcibly against the back of the neck, and produces the fracture through the trochanter; for if this were the case, would we not find the back of the neck lying against the ridge, and probably a depressed fracture in it? The fracture through the trochanter occurs antecedent to the impaction, and, therefore, antecedent to the inclination forwards of the posterior intertrochanteric ridge; and what seems to me to have occurred, and I think is capable of demonstration in the recent subject, was as follows: the patient, on being tripped, fell upon the posterior and outer surface of the greater trochanter, which was, therefore, thrown inwards and forwards; the impulse, therefore, instead of being received equally on all parts of the base of the neck, fell, in the first instance, on its posterior part at its junction with the greater trochanter and posterior intertrochanteric ridge, which giving way, impaction occurred, and after that the remainder of the fracture. The extent of the comminution and impaction will vary according to the fragility of the bone, and the amount of violence applied. The impaction of the neck will have unquestionably an influence in determining displacement of the trochanteric fragment; but, from the effects of blows on the trochanters, as witnessed on the dead body, the sequence of events seems to be as follows: direct lateral violence produces primary and immediate comminution of the trochanter, fracture of the base of the neck, impaction, additional fractures, and then displacement.

"Violence applied from behind forwards, produces primarily fracture and displacement inwards and forwards of the trochanter, impaction posteriorly, fracture of the base of the neck generally, and then displacement and fracture from the impaction. When the trochanter strikes the ground, it will be for the instant fixed, perhaps at this time, the extremity being in projectile force, acts obliquely, as a lever, in breaking up the base of the neck. I think this specimen points to the impaction acting powerfully at two points, viz.: at the upper part of the neck corresponding to the prominent ridge which bounds superiorly the digital fossa. It is at this part and a little in front of it, that the starting-point of the fracture of the trochanter originates. The second point is, where the neck joins the lesser trochanter. There the compact tissue of the neck in expanding to form the lesser trochanter, is less thick than higher up, and when it gives way and enters the cancellated structure, it drives backwards the base of the posterior trochanter and the intertrochanteric ridge. The impaction thus occurring simultaneously above and below, causes further detachment of the posterior part of the trochanter, even before the broken edge of the intertrochanteric ridge could possibly have come in contact with the posterior surface of the neck. Now, in this instance, the wedge-like action of the base of the neck at these two points, acting as it were differently, and instead of mutually contributing to detach the trochanter, have caused two different fractures. That above is the usual fissure or fracture of the trochanter; that below, instead of acting in a posterior direction on the lesser trochanter and posterior intertrochanteric ridge, has splintered the upper part of the shaft of the femur."